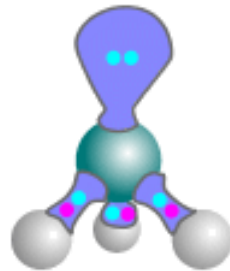
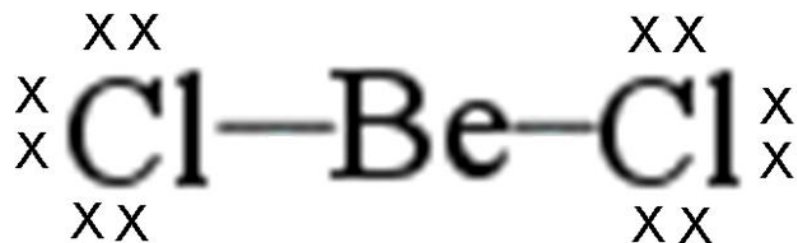


# Shapes of molecules

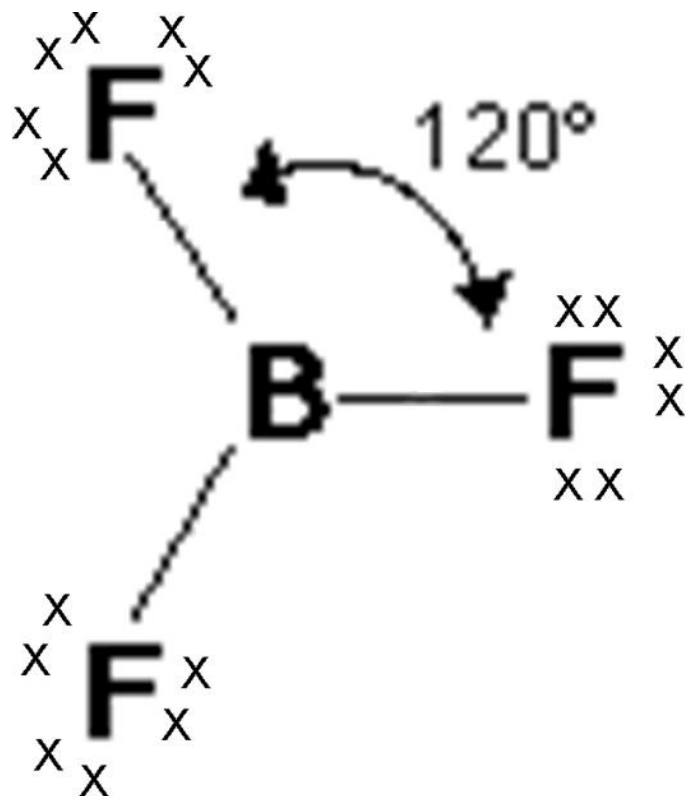


# Linear



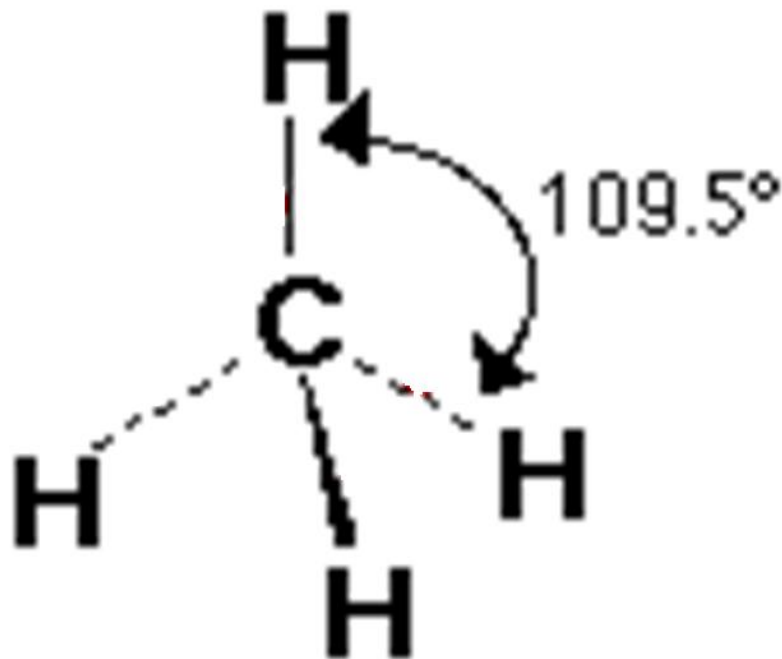
- 2 bonding pairs of electrons
- no lone pairs of electrons
- bond angle is 180°
- LINEAR shape
- *Other eg's H<sub>2</sub>, HCl, CO<sub>2</sub>,*

# Trigonal planar



- 3 bonding pairs of electrons
- no lone pairs of electrons
- bond angle is  $120^\circ$
- TRIGONAL PLANAR shape
- eg's  $\text{BCl}_3$ ,  $\text{BCl}_2\text{Br}$ ,  $\text{BClBr}_2$ ,  $\text{SO}_2$

# Tetrahedral

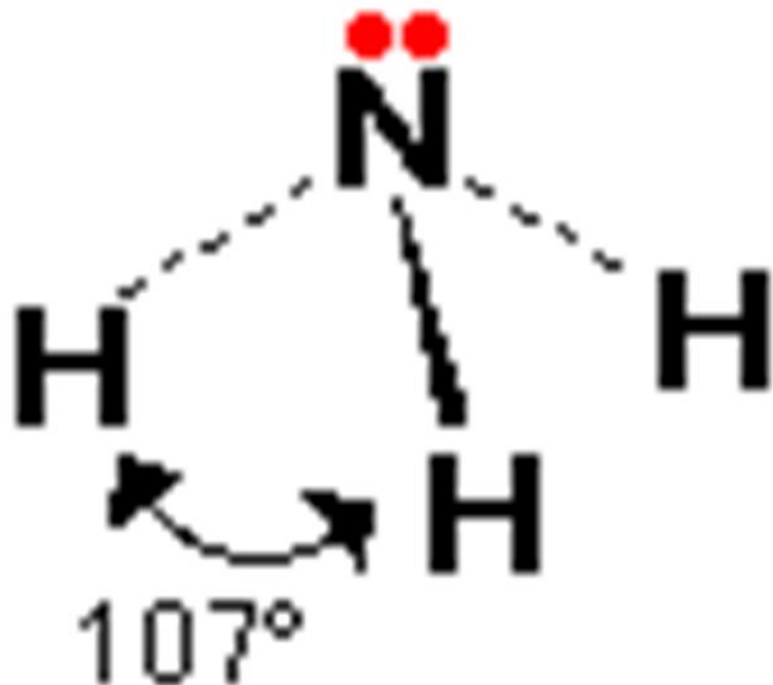


- 4 bonding pairs of electrons
- no lone pairs of electrons
- in 3D the furthest apart they can be is with a 109° angle
- TETRAHEDRAL shape
- *eg's*  $\text{SiH}_4$ ,  $\text{NH}_4^+$ ,  $\text{SO}_4^{2-}$ ,  $\text{PO}_4^{3-}$

# Trigonal pyramidal

- 3 bonding pairs

- 1 lone pair



- bond angle of  $109^\circ$

(The lone pair takes up space as if it were a bond, so the shape is tetrahedral like  $\text{CH}_4$  above but because lone pairs repel more than bonding pairs, the bond angle is less than the expected angle of  $109^\circ$ )

- Trigonal pyramidal shape

- *eg's*  $\text{NH}_3$ ,  $\text{NF}_3$ ,  $\text{PCl}_3$ ,  $\text{AsH}_3$ ,  $\text{AsF}_3$ ,  $\text{PF}_3$

# V-shaped

- 2 bonding pairs

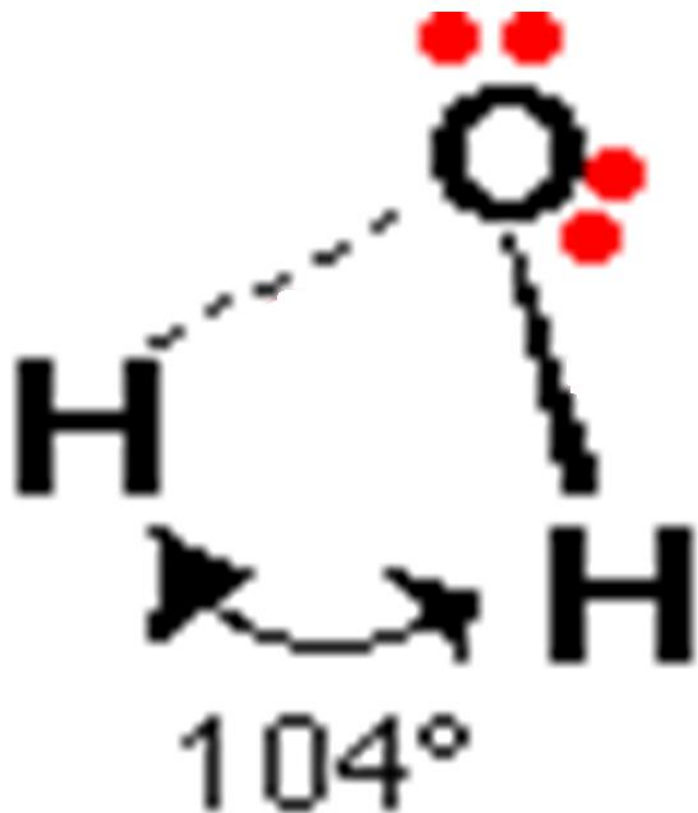
- 2 lone pairs

- Bond angle of  $104^\circ$

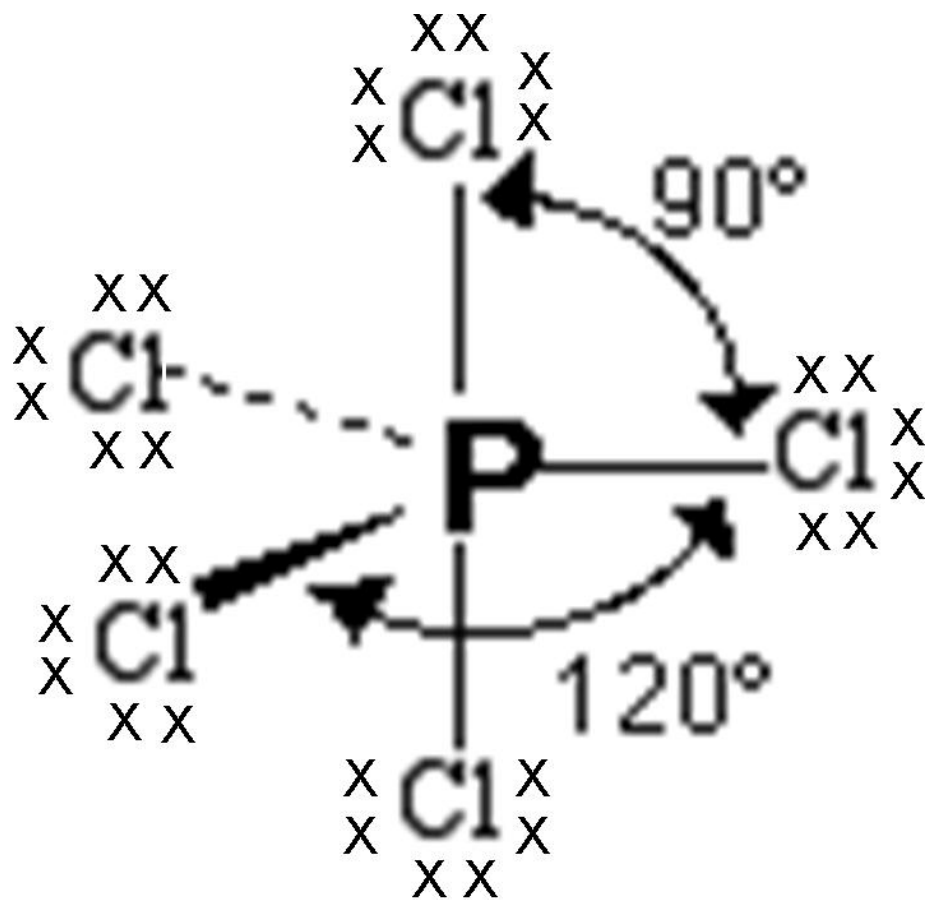
(Its expected shape is tetrahedral like  $\text{CH}_4$  above but because there are 2 lone pairs, the bond angle is even less than  $107^\circ$  above)

- V-shape

- eg's  $\text{H}_2\text{O}$ ,  $\text{OF}_2$ ,  $\text{SCl}_2$

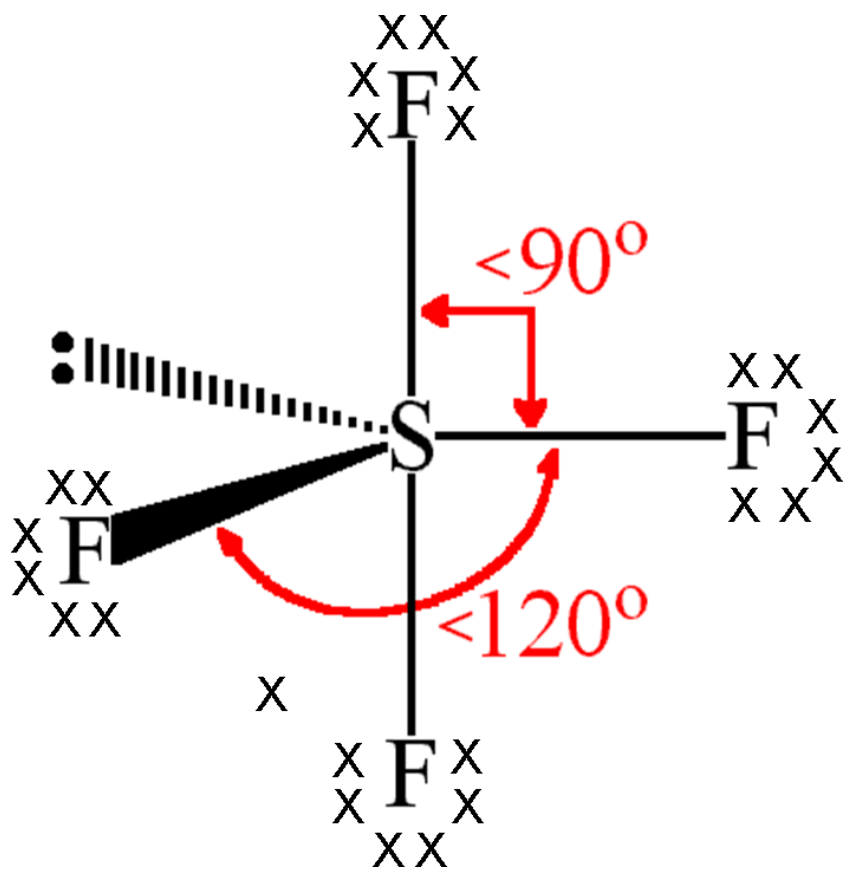


# Trigonal Bipyramidal



- 5 bonding pairs of electrons
- no lone pairs
- bond angles of  $90^\circ$  and  $120^\circ$
- TRIGONAL BIPYRAMIDAL shape
- eg's  $PCl_5$ ,  $AsF_5$

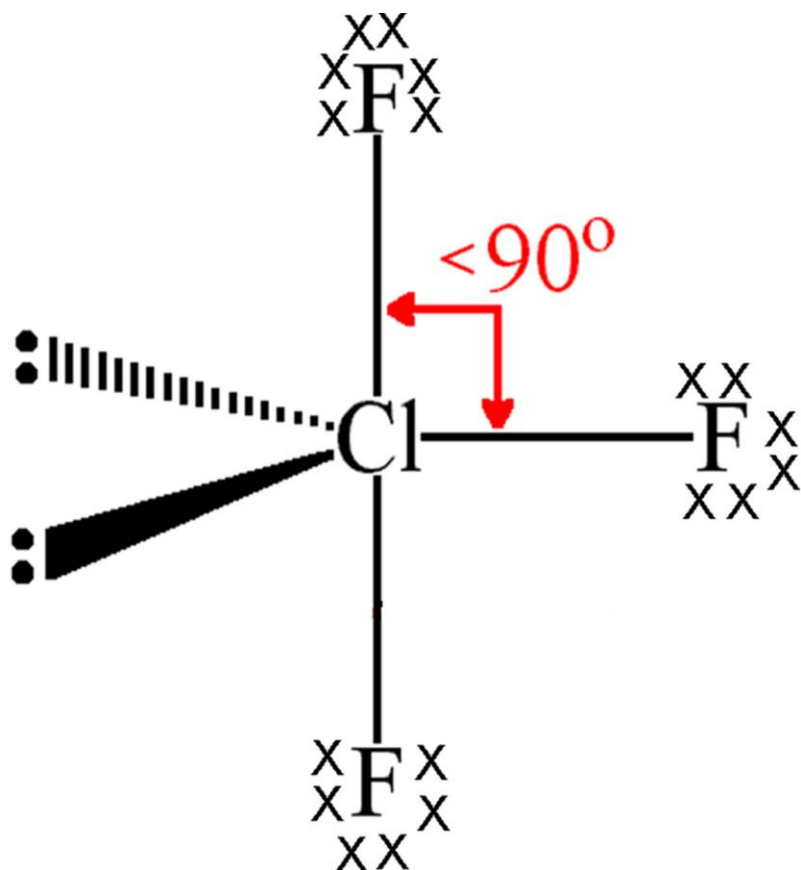
# Trigonal Bipyramidal - Seesaw



- A total of 5 pairs of electrons of which there are...
- 4 bonding pairs of electrons
- 1 lone pair of electrons
- Angles of  $90^\circ$  and  $120^\circ$
- Trigonal Bipyramid - SEESAW shape
- *eg's*  $SF_4$ ,  $SCl_4$

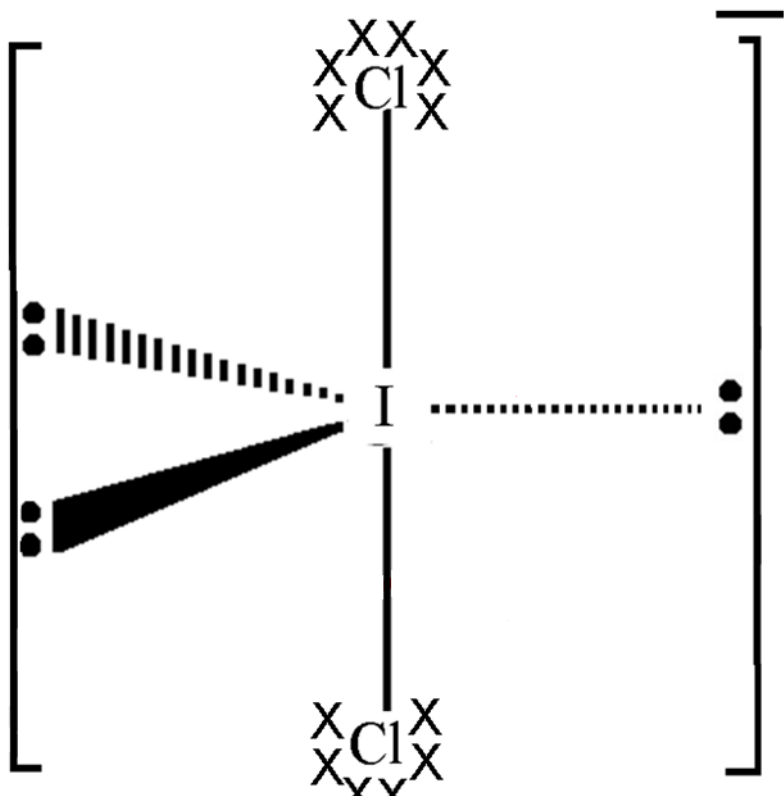


# Trigonal bipyramidal – T-shaped



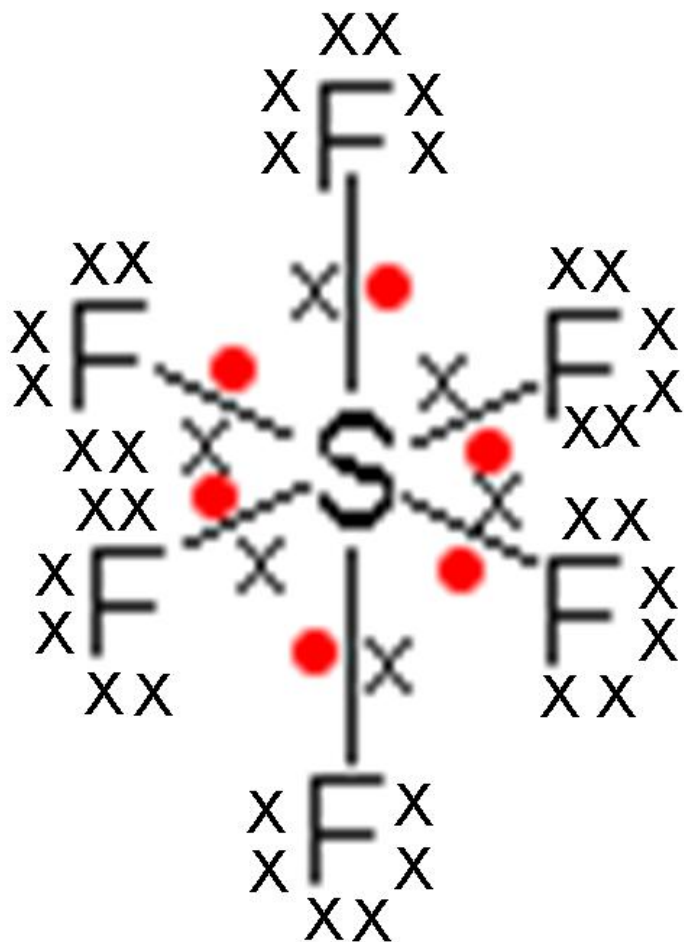
- A total of 5 pairs of electrons of which there are...
- 3 bonding pairs
- 2 lone pairs
- angles of 90° and 180°
- Trigonal bipyramidal  
T-SHAPED
- *eg's*  $ClF_3$ ,  $IF_3$ ,  $BrF_3$

# Trigonal bipyramidal - Linear



- A total of 5 pairs of electrons of which there are...
- 2 bonding pairs
- 3 lone pairs
- Trigonal Bipyramidal - LINEAR
- *eg's*  $[ICl_2]^-$

# Octahedral



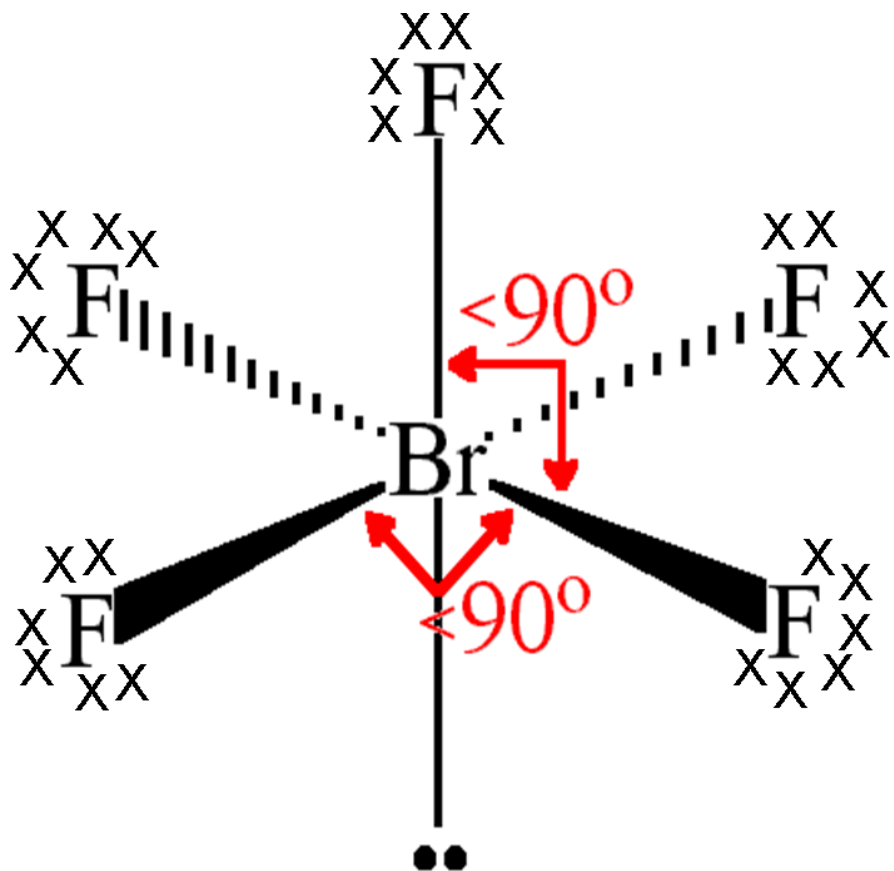
6 bonding pairs of electrons

all bond angles are  $90^\circ$

OCTAHEDRAL shape

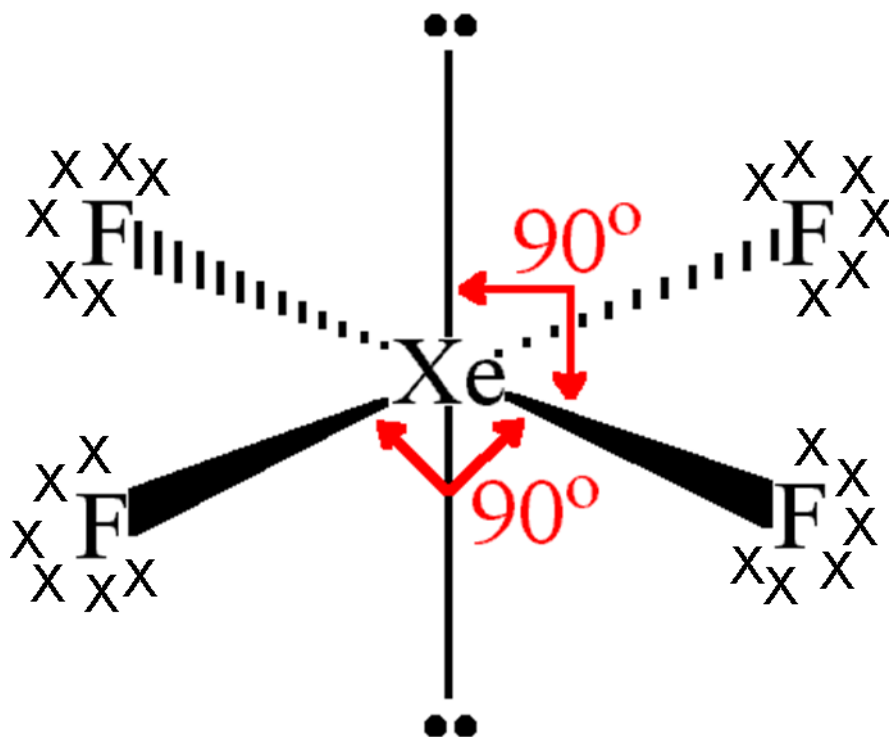
*eg's*  $SF_6$ ,  $PF_6^-$

# Octahedral - Square pyramid



- 6 pairs of electrons of which there are...
- 5 bonding pairs
- 1 lone pair
- Angles of  $90^\circ$
- Octahedral - SQUARE PYRAMID
- *eg's*  $\text{BrF}_5$ ,  $\text{IF}_5$

# Octahedral - Square planar



- 6 pairs of electrons of which there are...
- 4 bonding pairs
- 2 lone pairs
- angles of  $90^\circ$
- Octahedral - SQUARE PLANAR
- *eg*  $\text{BrF}_4^-$ ,  $\text{ICl}_4^-$